WHAT IS CLAIMED IS:

1. A stochastic processor comprising:

a fluctuation generator configured to output an analog quantity having a fluctuation;

a difference calculation means configured to output fluctuation difference data with an output of the fluctuation generator added to a difference in analog between two data;

a thresholding unit configured to perform thresholding on an output of the fluctuation difference calculation means to thereby output a pulse; and

a pulse detection means configured to detect the pulse output from the thresholding unit.

2. The stochastic processor according to Claim 1, wherein the fluctuation difference calculation means includes a distance calculator configured to calculate difference between the two data in analog, and an adder configured to add an output of the distance calculator to the output of the fluctuation generator.

3. The stochastic processor according to Claim 1, wherein the fluctuation difference calculation means includes an adder configured to add one of the two data in analog to the output of the fluctuation generator, and a distance calculator configured to calculate a difference between an output of the adder and an opposite data of the two data in analog.

4. The stochastic processor according to Claim 1, wherein the pulse detection means includes a counter configured to count the pulse.

5. The stochastic processor according to Claim 1, wherein the pulse detection means includes an integrator configured to integrate a width of the pulse.

6. The stochastic processor according to Claim 1, wherein the two data are element data representing elements of two vectors.

7. The stochastic processor according to Claim 6, wherein the two vectors are a reference vector and an input vector which are input externally,

a plurality of stochastic processing circuits are provided as corresponding to elements of the reference vector and elements of the input vector,

each of the stochastic processing circuits includes a memory configured to store the element data of the input reference vector, the fluctuation difference calculation means configured to output fluctuation difference data with the output of the fluctuation generator added to the difference in analog between the element data of the reference vector stored in the memory and the element data of the input vector, and the thresholding unit, and

the pulse detection means is configured to detect pulses output from the plurality of stochastic processing circuits.

8. The stochastic processor according to Claim 7, wherein pulse output ends of the plurality of stochastic processing circuits are connected in parallel to a common wire having an end connected to the pulse detection means, and delay circuits are provided on portions of the common wire between positions where the pulse output ends of the stochastic processing circuits are connected to the common wire.

9. The stochastic processor according to Claim 7, further comprising a plurality of vector column comparison circuits each including the plurality of stochastic processing circuits and the pulse detection means.

10. The stochastic processor according to Claim 7, wherein the memory is an analog memory, and the element data in analog of the reference vector is stored in the analog memory.

11. The stochastic processor according to Claim 10, wherein the analog memory includes a source follower circuit provided with a gate electrode to which a ferroelectric capacitor is connected, and the element data in analog of the reference vector is input to and stored in the ferroelectric capacitor.

12. The stochastic processor according to Claim 11, wherein paraelectric capacitor is further connected to the gate electrode of the source follower circuit.

13. The stochastic processor according to Claim 1, wherein the fluctuation difference calculation means includes an adder configured to add the difference in analog between the two data or one of the two data in analog to the output of the fluctuation generation circuit,

the adder includes a source follower circuit provided with a gate electrode to which first and second capacitors are connected in parallel,

wherein the output of the fluctuation generation circuit is input to the first capacitor, and the difference in analog between the two data or one of the two data in analog is input to the second capacitor.

14. The stochastic processor according to Claim 13, wherein the gate electrode of the source follower circuit of the adder is connected to a ground terminal through a switching device.

15. The stochastic processor according to Claim 1, wherein the counter is a ripple counter.

16. The stochastic processor according to Claim 1, wherein the fluctuation is a chaos fluctuation.

17. The stochastic processor according to Claim 1, wherein the fluctuation is a fluctuation obtained by amplifying a noise.

18. The stochastic processor according to Claim 1, wherein the fluctuation generator is configured to generate a periodic output as an output having a fluctuation, and histogram values of an output in one period of the periodic output are substantially equal.

19. The stochastic processor according to Claim 2, wherein the distance calculator includes a subtraction device, and

the subtraction device includes a source follower circuit provided with a gate electrode to which two capacitors are connected in parallel, and

when capacitances of the two capacitors are equal and represented by C_1, capacitances of NMIS and PMIS forming the source follower circuit are represented by C_N and C_P, respectively, and an input voltage that causes an

output of the source follower circuit to start increasing from a potential of a low-voltage side voltage source is V_{Low},

when a voltage V_Z is calculated according to a formula given by $V_Z = V_{Low}$ / $[2C_1 / (2C_1 + C_N + C_P)]$, the two data are voltages represented by V_a and V_b,

subtraction in case of V_a刧V_b in operation of $V_a - V_b$ is carried out by applying a voltage of $V_1 = V_Z - V_a$ and a voltage $V_2 = V_Z + V_b$ to electrodes of the two capacitors which are not connected to the gate electrode of the source follower circuit.

20. The stochastic processor according to Claim 19, wherein the distance calculator includes two subtraction devices, and when the two data are represented by V_{in} and V_{ref}, an output V_{M1} is obtained in one of the two subtraction devices by setting $V_a = V_{in}$ and $V_b = V_{ref}$, an output V_{M2} is obtained in an opposite subtraction device of the two subtraction devices by setting $V_a = V_{ref}$ and $V_b = V_{in}$, and the voltages V_{M1} and V_{M2} are input to the adder, thereby calculating an absolute value of difference between V_{in} and V_{ref}.

21. The stochastic processor according to Claim 1, wherein the thresholding unit is formed by a CMIS inverter.

22. The stochastic processor according to Claim 1, wherein a switching device is provided just before the thresholding unit.

23. The stochastic processor according to Claim 21, further comprising:

a current detector configured to detect a current of a power supply line of the thresholding unit; and

a fluctuation generator control circuit configured to control the output of the fluctuation generator based on an output of the current detector.

24. The stochastic processor according to Claim 23, wherein the fluctuation generator control circuit is configured to increase an extent of fluctuation of the fluctuation generator when the current detected by the current detector is smaller than a predetermined value.

25. The stochastic processor according to Claim 23, wherein the fluctuation generator control circuit is configured to add a positive bias or a negative bias to the output of the fluctuation generator to cause an average value of the output to be close to a threshold of the thresholding unit, when the current detected by the current detector is smaller than a predetermined value.

26. A method of driving a stochastic processor comprising a plurality of stochastic processing circuits corresponding to elements of a reference vector and elements of an input vector which are input externally, a pulse detection means, and a predetermined number of vector column comparison circuits each having the plurality of stochastic processing circuits and the pulse detection means, wherein

each of the stochastic processing circuits includes a fluctuation generator configured to output an analog quantity having fluctuation, a memory configured to store element data of the input reference vector, a fluctuation difference

calculation means configured to output fluctuation difference data with the output of the fluctuation generator added to a difference in analog between the element data of the reference vector stored in the memory and the element data of the input vector, and a thresholding unit configured to perform thresholding on an output of the fluctuation difference calculation means and output a pulse,

the pulse detection means is configured to detect pulses output from thresholding units of the plurality of stochastic processing circuits, thereby detecting a distance between the input vector and the reference vector, the method comprising the step of:

when columns of the vector column comparison circuits are fewer than columns of the reference vectors and extraction of k (k: natural number) reference vectors closer in distance to the input vector is performed,

writing the reference vectors of not more than the columns of the vector column comparison circuits to memories of the plurality of stochastic processing circuits of the vector column comparison circuits;

extracting the k reference vectors closer to the input vector from the written reference vectors; and

writing at least part of remaining reference vectors to vector column comparison circuits other than the vector column comparison circuits corresponding to the extracted reference vectors, thereby performing the extraction.

27. The driving method according to Claim 26, wherein the steps of writing and extracting the reference vector are repeated.

28. A recognition process device comprising:

a stochastic processor according to Claim 1;

a feature extraction circuit configured to extract a feature of information of an object to be recognized which is input externally and input the extracted feature to the stochastic processor as an input vector; and

a memory configured to store a reference vector group composed of vectorized feature of the information of the object, wherein

the stochastic processor is configured to identify a reference vector corresponding to the input vector from among the reference vector group stored in the memory.

29. The recognition process device according to Claim 28, wherein the information of the object is voice.

30. The recognition process device according to Claim 29, wherein the reference vector group is comprised of a vector group with feature quantities of the voice arranged in time series, and have vectors of plural columns in which the feature quantities of the voice recognized as identical by a human being are shifted from each other in time series.

31. The recognition process device according to Claim 28, wherein the information of the object is an image.

32. The recognition process device according to Claim 31, wherein the reference vector group is comprised of a vector group obtained by vectorizing feature

quantities of an image which are recognized as identical by the human being and have different numeric values.

33. The recognition process device according to Claim 32, wherein the image recognized as identical by the human being is a part of the human being, and the feature quantities of the image with different numeric values is a distance between parts of the human being.

34. The recognition process device according to Claim 28, wherein the information of the object is a behavior of the human being, and the recognized behavior is output.

35. The recognition process device according to Claim 34, wherein the reference vector group is comprised of a vector group obtained by vectorizing numerically represented data of action information of the human being.

36. The recognition process device according to Claim 35, wherein when a reaction to the output behavior is agreeable to the human being, at least part of a value of the reference vector is changed to allow the reference vector corresponding to the output behavior to be easily selected, and when the reaction to the output behavior is disagreeable to the human being, the at least part of the value of the reference vector is changed to make it difficult for the reference vector corresponding to the output behavior to be selected.

37. The recognition process device according to Claim 36, wherein the action

information involves at least one of an operation history of electric appliance, an output of an infrared sensor, an output of a room-temperature sensor, an output of a humidity sensor, an output of a body temperature sensor, an output of a brain-wave sensor, an output of a pulse sensor, an output of an eye sensor, an output of a perspiration sensor, an output of a muscle potential sensor, time information, day information of a week, and the output of the recognition process device.